

Physicalism and New-Wave-Reductionism*In: *Grazer Philosophische Studien* 61 (2001), 257-261.Ansgar Beckermann
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In his book *Psychoneural Reduction – The New Wave* John Bickle takes up a question that indeed deserved fresh consideration for quite some time – the question of whether psychology can be reduced to neurobiology. Of course, Bickle is right. In the last twenty years the general debate about the concept of theory reduction led to a lot of new insights. It should have been natural to reconsider the old discussion based on Nagel's concept of reduction in the light of more recent views. With Bickle I believe that Hooker's contributions, in particular, have substantially advanced the general debate.¹ However, I am less convinced that structuralism provides the most suitable framework for a reformulation of a general concept of reduction. I also wholeheartedly agree with Bickle that the idea of nonreductive physicalism is incoherent – especially if one tries to spell it out entirely in terms of supervenience.² We disagree, however, on the crucial question of what physicalism amounts to.

Bickle does not pursue the question of whether psychology is reducible to neurobiology for its own sake. Rather, in his view this question lies at the core of the mind-body problem. Traditionally, he concedes, the philosophical mind-body problem is ontological. It concerns questions like "What is the nature of mind?", "Are mental phenomena identical with physical phenomena?", "Or is the mind something more than just a physical phenomenon?" This way to approach the problem, however, has proven unsuccessful. "... its exclusive ontological focus is perhaps what keeps the mind-body problem unsolved, even after a century of groundbreaking work in the brain and behavioral sciences." (40) So, Bickle claims, it might turn out to be useful to change focus – to suggest that the core problem in the philosophy of mind is the problem of whether psychology can be reduced to neurobiology. "I will refer to this proposal as the *inter-theoretic-reduction reformulation* of the mind-body problem, or for short, the *IR reformulation*." (41) But isn't this way of reformulating the mind-body problem a way of changing topics? Bickle seems to think that it is not since serious ways of dealing with ontological questions have to take into account the results of scientific research. Science comes first, ontology follows in its wake. "The defensible ontological conclusion becomes secondary to and dependent on this logically prior issue of intertheoretic reduction." (41) This also is the reason why, according to Bickle, "each traditional solution [of the mind-body problem] gets reformulated as prediction concerning the reductive fate of folk psychology." (45)

This, however, is not quite true. Not all ontological questions can be answered in this way. The relation between ontology and intertheoretic reduction is a little less tight than Bickle thinks. Let us start at the roots. Of course, there can be no doubt that, from the very beginning, proponents of the identity theory claimed that there was a special relation between the question of whether mental properties are identical to physical properties and the question of whether psychology can be reduced to neurobiology. One reason for this view resided in the examples of successful property identity claims that the proponents of the identity theory relied on. Why is temperature identical to mean molecular energy? The answer seemed to be straightforward: Because ther-

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* I would like to thank Antonia Barke for improving my English.

¹ I have considered Hooker's ideas in a number of articles and particularly emphasized the importance of *system-relative* reduction. Cf. Beckermann (1992a, 1992b, 1997, 2001).

² Cf. Beckermann (1992a, 1992b, 1996, 1997, 2001).

thermodynamics can be reduced to statistical mechanics. But why is this? *What is the rationale* that allows us to draw conclusions about identity claims from facts about intertheoretic reduction? This is an important question that has only been addressed by very few philosophers. Joseph Levine is one of them.

In his 1983 paper “Materialism and Qualia: The Explanatory Gap” Levine gives a two step answer to this question. If we were asked what temperature is we would, according to Levine, give an answer like this: Temperature is the property of bodies that causes certain sensations of warmth and coldness in us, and that causes the mercury column of thermometers that come into contact with these bodies to rise or fall, and that causes certain chemical reactions and so forth. In other words, we would characterize temperature by its causal role alone. This is the first step. But this by itself would not suffice. A second step is needed:

„... our knowledge of chemistry and physics makes intelligible how it is that something like the motion of molecules could play the causal role we associate with heat. Furthermore, antecedent to our discovery of the essential nature of heat, its causal role ... exhausts our notion of it. Once we understand how this causal role is carried out there is nothing more we need to understand. (Levine 1983, 357)

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Thus, we derive the truth of the claim

(1) Temperature is identical to mean molecular energy

from two premises:

(2) Temperature is exclusively characterized by its causal role.

(3) Physics can make it intelligible that the mean kinetic energy of the molecules of a gas plays exactly this causal role.³

But if these are the reasons for our acceptance of the identity claim (1) what has intertheoretic reduction to do with it? The answer is obvious. It is exactly the fact that thermodynamics can be reduced to statistical mechanics *and* the way this reduction is carried out which demonstrates that mean molecular energy plays the very causal role by which temperature is characterized. Intertheoretic reduction is the ordinary means by which we establish the truth of propositions like (3).

At the same time, this helps us to see the importance and the limitations of intertheoretic reduction with regard to questions concerning the ontological status of properties. If we are concerned with properties that are exclusively characterized by their causal role, intertheoretic reduction is at center stage. For causal roles are implicitly defined by the laws which state how things behave that have the properties in question. The causal role which characterizes a property F is thus captured by the theory \mathbf{T}_R which comprises all these laws. To show that – let us say – X plays exactly the causal role by which property F is characterized, therefore, is to deduce a smooth analogue \mathbf{T}^*_R in Hooker’s sense from a general theory \mathbf{T}_B about X .

Things are very different, however, if we are concerned with properties that are *not* exclusively characterized by their causal role. Think, for example, of sensations like pain that at least seem to be characterized also by their phenomenal qualities. In these cases intertheoretic reduction is not enough. Let us assume, for example, that \mathbf{T}_R is that part of folk psychology or scientific psychology which tells us how people behave that are in pain. And let us assume further that we are able to deduce a smooth analogue \mathbf{T}^*_R from neurobiology. This, of course, would show that

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³ Cf. also Levine (1993). Chalmers develops a very similar view in (1996, ch. 2).

⁴ Cf. especially Broad (1925).

⁵ A more detailed analysis of Broad’s distinction between emergent and reductively explainable properties is given in Beckermann (2000).

there is a neural state N that has exactly the causal role pain has. But it would not show that pain can, in an ontologically interesting sense, be reduced to N . This would be shown only if we were also able to deduce from neurobiology that being in N has all the characteristic phenomenal qualities of pain. Some philosophers claim that the insolubility of the mind-body problem stems from the fact that this is impossible for reasons of principle. But let us sidestep this issue. With regard to my argument it is sufficient to understand that what has to be shown in the case of pain cannot be shown by theory reduction alone. Theory reduction thus is not the *general* means by which all questions concerning the ontological status of mental properties can be answered.

I would like to round off these considerations by a general statement about what, in my mind, the mind-body problem amounts to. Identity is not the issue. Concerning the question about the ontological status of mental properties the problem is whether these properties fit into a general naturalistic world view. And this – in C.D. Broad's terms⁴ – is the problem of whether mental properties are emergent or reductively explainable.⁵ If a system S is made up of physical constituents C_1, \dots, C_n arranged in manner R , i.e., if S has microstructure $[C_1, \dots, C_n; R]$, a property F of S is reductively explainable iff it follows from the *fundamental* laws of nature that all systems with this microstructure have all features that are characteristic of F . F is emergent iff it is a true, but not fundamental, law of nature that all systems with microstructure $[C_1, \dots, C_n; R]$ have F although F is not reductively explainable.

Therefore, on the assumption that F is exclusively characterized by a causal role, F is reductively explainable iff it follows from the fundamental laws applying to the constituents C_1, \dots, C_n that the microstructure $[C_1, \dots, C_n; R]$ plays exactly this role. And if \mathbf{T}_R is the theory that expresses the causal role of F this amounts to nothing else than to deduce a smooth analogue \mathbf{T}^*_R from the theory \mathbf{T}_B which comprises the fundamental laws. Thus, we arrive at the same result again: With regard to properties that are exclusively characterized by their causal role intertheoretic reduction is decisive. If, however, F has characteristic features that go beyond causal roles, intertheoretic reduction does not suffice. For, at least in general, intertheoretic reduction will not be able to reveal whether systems with a certain microstructure have these features, too.

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